HP ProCurve 2910al Switch Series

Product overview

The HP ProCurve 2910al Switch Series consists of four switches: the HP ProCurve 2910al-24G and 2910al-24G-PoE+ Switches with 24 10/100/1000 ports, and the HP ProCurve 2910al-48G and 2910al-48G-PoE+ Switches with 48 10/100/1000 ports. Each switch has four dual-personality ports for 10/100/1000 or mini-GBIC connectivity. In addition, the 2910al switch supports up to four optional 10-Gigabit (CX4 and/or SFP+) ports, thereby offering the most flexible and easy-to-deploy uplinks in its class. Together with static and RIP IPv4 routing, robust security and management, enterprise-class features, free lifetime warranty, and free software updates, the 2910 series is a cost-effective, scalable solution for customers who are building high-performance networks. These switches can be deployed at enterprise edge and remote branch offices, converged networks, and data center top of rack.

Key features

- High-performance Gigabit access switch
- Four optional 10-Gigabit ports (CX4 and/or SFP+)
- IEEE 802.3af/802.3at functionality (PoE/PoE+)
- Layer 2 switching with static and RIP IP routing
- Lifetime Warranty, sFlow, ACLs, and rate limiting

Features and benefits

Industry-leading warranty

Connectivity

• **10 Gbps Ethernet connectivity:** Up to four optional and flexible 10-Gigabit ports (CX4 and/or SFP+)--with optional interconnect kit for short-distance connectivity

• **IPv6:**
- **IPv6 host:** the switches can be managed and deployed at the edge of IPv6 networks
- **Dual stack (IPv4/IPv6):** provides transition mechanism from IPv4 to IPv6; supports connectivity for both protocols
- **MLD snooping:** forwards IPv6 multicast traffic to the appropriate interface; prevents IPv6 multicast traffic from flooding the network

• **IEEE 802.3af Power over Ethernet:** provides up to 15.4 W per port to IEEE 802.3af-compliant PoE powered devices such as IP phones, wireless access points, and security cameras

• **IEEE 802.3at Power Over Ethernet Plus:** provides up to 30 W per port to IEEE 802.3at compliant PoE/PoE+ powered devices such as video IP phones, IEEE 802.11n wireless access points, and advanced pan/zoom/tilt security cameras

• **Pre-standard PoE support:** detects and provides power to pre-standard PoE devices; see list of supported devices in the product FAQ at www.ProCurve.com

• **Auto-MDIX:** automatically adjusts for straight-through or crossover cables on all 10/100/1000 ports

• **Dual-personality functionality:** four 10/100/1000 ports or SFP slots for optional fiber connectivity such as Gigabit-SX, -LX, -LH, 100-FX, 100-BX, and 1000-BX

• **Stacking capability:** single IP address management for a virtual stack of up to 16 switches, including the HP ProCurve Switch 2500 Series, 2510 Series, 2600 Series, 2610 Series, 2800 Series, 2810 Series, 2900 Series, 2910al Series, 3400cl Series, 3500yl Series, 4200vl Series, 6108, 6200yl-24G-mGBIC, and 6400cl Series

Performance

• **High-performance architecture:** 128 Gbps switching fabric with up to 95 million pps (24-port switches) and 176 Gbps switching fabric with up to 131 million pps (48-port switches)

• **Selectable queue configurations:** increase performance by selecting the number of queues and associated memory buffering that best meet the requirements of your network applications

Resiliency and high availability

• **IEEE 802.1s Multiple Spanning Tree:** provides high link availability in multiple VLAN environments by allowing multiple spanning trees; provides legacy support for IEEE 802.1d and IEEE 802.1w

• **IEEE 802.3ad Link Aggregation Protocol (LACP) and ProCurve trunking:** support up to 24 trunks, each with up to 8 links (ports) per trunk

• **Optional redundant power supply:** supplies backup power in case of power failure (Note: HP ProCurve 620 Redundant/External Power Supply provides only RPS functionality for the 2910al series)

Manageability

• **RMON, XRMON, and sFlow:** provide advanced monitoring and reporting capabilities for statistics, history, alarms, and events

• **Uni-Directional Link Detection (UDLD):** monitors a link between two switches and blocks the ports on both ends of the link if the link goes down at any point between the two devices

• **Command authorization:** leverages RADIUS to link a custom list of CLI commands to individual network administrator's login; also provides an audit trail

• **Dual flash images:** provides independent primary and secondary operating system files for backup while upgrading

* For as long as you own the product, with next-business-day advance replacement (available in most countries). The following hardware products and their related series modules have a one-year hardware warranty with extensions available: HP ProCurve Routing Switch 9300m Series, HP ProCurve Switch 8100fl Series, HP ProCurve Network Access Controller 800, and HP ProCurve DCM Controller. The following hardware mobility products have a one-year hardware warranty with extensions available: HP ProCurve M111 Client Bridge, HP ProCurve MSM3xx-R Access Points, HP ProCurve MSM7xx Mobility and Access Controllers, HP ProCurve RF Manager IDS/IPS Systems, HP ProCurve MSM Power Supplies, HP ProCurve 1-Port Power Injector, and HP ProCurve CNMS Appliances. Disk drives in the HP ProCurve ONE Services zl Modules have a five year hardware warranty. Standalone software, upgrades, or licenses may have a different warranty duration. For details, refer to the ProCurve Software License, Warranty, and Support booklet at www.procurve.com/warranty.

• **Multiple configuration files:** allow multiple configuration files to be stored to flash image

• **Friendly port names:** allow assignment of descriptive names to ports

• **Find-Fix-and-Inform:** finds and fixes common network problems automatically, then informs administrator

• **Software updates:** free downloads from the Web

• **Troubleshooting:** ingress/egress port monitoring enables network problem-solving

Layer 2 switching

• **VLAN support and tagging:** supports the IEEE 802.1Q (4,094 VLAN IDs) and 256 VLANs simultaneously

• **GARP VLAN Registration Protocol:** allows automatic learning and dynamic assignment of VLANs

• **Jumbo packet support:** supports up to 9,220-byte frame size to improve performance of large data transfers

Layer 3 routing

• **Static IP routing:** provides manually configured routing; includes ECMP capability

• **RIP:** provides RIPv1 and RIPv2 routing

Security

• **Multiple user authentication methods:**
- **IEEE 802.1X:** industry-standard method of user authentication using an IEEE 802.1X supplicant on the client in conjunction with a RADIUS server
- **Web-based authentication:** similar to IEEE 802.1X, provides a browser-based environment to authenticate clients that do not support the IEEE 802.1X supplicant
- **MAC-based authentication:** client is authenticated with the RADIUS server based on the client's MAC address

• **Authentication flexibility:**
- **Multiple IEEE 802.1X users per port:** provides authentication of up to eight IEEE 802.1X users per port; prevents user "piggybacking" on another user's IEEE 802.1X authentication
- **Concurrent IEEE 802.1X and Web or MAC authentication schemes per port:** switch port will accept any of IEEE 802.1X and either Web or MAC authentications

• **Access control lists (ACLs):** provide IP Layer 3 filtering based on source/destination IP address/subnet and source/destination TCP/UDP port number

• **Identity-driven ACL:** enables implementation of a highly granular and flexible access security policy and VLAN assignment specific to each authenticated network user

• **Dynamic ARP protection:** blocks ARP broadcasts from unauthorized hosts, preventing eavesdropping or theft of network data

• **DHCP protection:** blocks DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks

• **Port monitoring for network threats:** provides sampled port traffic using sFlow technology to the HP ProCurve Network Immunity Manager application for Network Behavior Anomaly Detection (NBAD) analysis to detect threats and mitigate threats at the port where the threat originated

• **Source-port filtering:** allows only specified ports to communicate with each other

• **RADIUS/TACACS+:** eases switch management security administration by using a password authentication server

• **Secure Shell (SSHv2):** encrypts all transmitted data for secure, remote command-line interface (CLI) access over IP networks

• **Secure FTP:** allows secure file transfer to/from the switch; protects against unwanted file downloads or unauthorized copying of switch configuration file

• **Secure Sockets Layer (SSL):** encrypts all HTTP traffic, allowing secure access to the browser-based management GUI in the switch

• **Port security:** allows access only to specified MAC addresses, which can be learned or specified by the administrator

• **MAC address lockout:** prevents configured particular MAC addresses from connecting to the network

• **Switch management logon security:** can require either RADIUS or TACACS+ authentication for secure switch CLI logon

• **STP BPDU port protection:** blocks Bridge Protocol Data Units (BPDUs) on ports that do not require BPDUs, preventing forged BPDU attacks

• **USB Secure Autorun (requires HP ProCurve Manager Plus):** deploys, diagnoses, and updates switch using USB flash drive; works with secure credential to prevent tampering

• **STP Root Guard:** protects root bridge from malicious attack or configuration mistakes

• **Custom banner:** displays security policy when users log in to the switch

• **Per-port broadcast throttling:** selectively configures broadcast control on heavy traffic port uplinks

Convergence

• **IP multicast snooping and data-driven IGMP:** automatically prevents flooding of IP multicast traffic

• **LLDP-MED (Media Endpoint Discovery):** a standard extension of LLDP that stores values for parameters such as QoS and VLAN to automatically configure network devices such as IP phones

• **IEEE 802.1AB Link Layer Discovery Protocol (LLDP):** automated device discovery protocol for easy mapping by network management applications

• **PoE/PoE+ allocations:** supports multiple methods (automatic, IEEE 802.3at dynamic, LLDP-MED fine-grain, IEEE 802.3af device class, or user specified) to allocate and manage PoE/PoE+ power for more efficient energy savings

Quality of Service (QoS)

• **Traffic prioritization (IEEE 802.1p):** allows real-time traffic classification into eight priority levels mapped to eight queues

• **Layer 4 prioritization:** enables prioritization based on TCP/UDP port numbers

• **Class of Service (CoS):** sets the IEEE 802.1p priority tag based on IP address, IP Type of Service (ToS), L3 protocol, TCP/UDP port number, source port, and DiffServ

• **Rate Limiting:** per-port ingress enforced maximums

Monitor and diagnostics

• **Port mirroring:** enables traffic on a port to be simultaneously sent to a network analyzer for monitoring

Warranty and support

• **ProCurve Lifetime Warranty:** for as long as you own the product, with next-business-day advance replacement (available in most countries)

• **Electronic and telephone support:** limited electronic and telephone support is available from HP; refer to the HP Web site at www.procurve.com/support for details on the support provided and the period during which support is available

• **Software releases:** refer to the HP Web site at www.procurve.com/support for details on the software releases provided and the period during which software releases are available

HP ProCurve 2910al Switch Series

Specifications

	HP ProCurve 2910al-24G Switch (J9145A)	HP ProCurve 2910al-48G Switch (J9147A)
Ports	20 auto-sensing 10/100/1000 ports (IEEE 802.3 Type 10Base-T, IEEE 802.3u Type 100Base-TX, IEEE 802.3ab Type 1000Base-T); Media Type: Auto-MDIX; Duplex: 10Base-T/100Base-TX: half or full; 1000Base-T: full only 4 dual-personality ports; each port can be used as either an RJ-45 10/100/1000 port (IEEE 802.3 Type 10Base-T; IEEE 802.3u Type 100Base-TX; IEEE 802.3ab 1000Base-T Gigabit Ethernet) or as a mini-GBIC slot (for use with mini-GBIC transceivers) 1 RJ-45 serial console port Supports a maximum of 4 10-GbE ports, with optional module	44 auto-sensing 10/100/1000 ports (IEEE 802.3 Type 10Base-T, IEEE 802.3u Type 100Base-TX, IEEE 802.3ab Type 1000Base-T); Media Type: Auto-MDIX; Duplex: 10Base-T/100Base-TX: half or full; 1000Base-T: full only 4 dual-personality ports; each port can be used as either an RJ-45 10/100/1000 port (IEEE 802.3 Type 10Base-T; IEEE 802.3u Type 100Base-TX; IEEE 802.3ab 1000Base-T Gigabit Ethernet) or as a mini-GBIC slot (for use with mini-GBIC transceivers) 1 RJ-45 serial console port Supports a maximum of 4 10-GbE ports, with optional module
Physical characteristics		
Dimensions	14.4(d) x 17.4(w) x 1.73(h) in. (36.58 x 44.2 x 4.4 cm) (1U height)	14.4(d) x 17.42(w) x 1.73(h) in. (36.58 x 44.25 x 4.4 cm) (1U height)
Weight	10.92 lb. (4.95 kg)	11.2 lb. (5.08 kg)
Memory and processor		
Processor	Dual ARM1156T2S @ 515 MHz, 4 MB flash, 1 GB flash ROM, 512 MB SDRAM; packet buffer size: 6 MB	Dual ARM1156T2S @ 515 MHz, 4 MB flash, 1 GB flash ROM, 512 MB SDRAM; packet buffer size: 6 MB
Mounting	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only.	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only.
Performance		
1000 Mb Latency	< 2.9 µs (FIFO 64-byte packets)	< 2.9 µs (FIFO 64-byte packets)
10 Gbps Latency	< 1.3 µs (FIFO 64-byte packets)	< 1.3 µs (FIFO 64-byte packets)
Throughput	up to 95 million pps (64-byte packets)	up to 131 million pps
Switching capacity	128 Gbps	176 Gbps
Routing table size	2,000 entries	2,000 entries
MAC address table size	16,000 entries	16,000 entries
Environment		
Operating temperature	32°F to 131°F (0°C to 55°C)	32°F to 122°F (0°C to 50°C)
Operating relative humidity	15% to 95% @ 104°F (40°C), non-condensing	15% to 95% @ 104°F (40°C), non-condensing
Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 131°F (-40°C to 55°C)
Non-operating/Storage relative humidity	15% to 95% @ 149°F (65°C), non-condensing	15% to 95% @ 149°F (65°C), non-condensing
Altitude	up to 10,000 ft. (3 km)	up to 10,000 ft. (3 km)
Acoustic	Power: 53.5 dB, Pressure: 39.4 dB; DIN 45635T.19 per ISO 7779	Power: 53.5 dB, Pressure: 39.4 dB; DIN 45635T.19 per ISO 7779
Electrical characteristics		
		Achieved Miercom Certified Green Award
Description	The switch automatically adjusts to any voltage between 100-127 and 200-240 volts and either 50 or 60 Hz	The switch automatically adjusts to any voltage between 100-127 and 200-240 volts and either 50 or 60 Hz
Maximum heat dissipation	279 BTU/hr (295 kJ/hr)	356 BTU/hr (376 kJ/hr)
Voltage	100-127 / 200-240 VAC	100-127 / 200-240 VAC
Current	1.7 / 0.9 A	2.1 / 1.1 A
Idle power	49 W	64 W
Power consumption	82 W	105 W
Frequency	50 / 60 Hz	50 / 60 Hz
Notes	Idle power is the power consumption of the base system with no traffic. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the power consumption of the base system with no traffic. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.
Safety	EN 60950/IEC 60950; CAN/CSA 22.2 No. 60950; EN 60825; UL 60950	EN 60950/IEC 60950; CAN/CSA 22.2 No. 60950; EN 60825; UL 60950
Emissions	FCC part 15 Class A; EN 55022/CISPR-22 Class A; VCCI Class A	FCC part 15 Class A; EN 55022/CISPR-22 Class A; VCCI Class A
Immunity		
EN	EN 55024, CISPR 24	EN 55024, CISPR 24
ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD	IEC 61000-4-2; 4 kV CD, 8 kV AD
Radiated	IEC 61000-4-3; 3 V/m	IEC 61000-4-3; 3 V/m
EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
Surge	IEC 61000-4-5; 1 kV / 2 kV AC, 1 kV signal, 0.5 kV DC	IEC 61000-4-5; 1 kV / 2 kV AC, 1 kV signal, 0.5 kV DC
Conducted	IEC 61000-4-6; 3 V	IEC 61000-4-6; 3 V
Power frequency magnetic field	IEC 61000-4-8; 1 A/m	IEC 61000-4-8; 1 A/m
Voltage dips and interruptions	IEC 61000-4-11; > 95% reductions, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; > 95% reductions, 0.5 period; 30% reduction, 25 periods

HP ProCurve 2910al Switch Series

Specifications (continued)

	HP ProCurve 2910al-24G Switch (J9145A)	HP ProCurve 2910al-48G Switch (J9147A)
Harmonics	IEC 61000-3-2	IEC 61000-3-2
Flicker	IEC 61000-3-3	IEC 61000-3-3
Management	HP ProCurve Manager Plus; HP ProCurve Manager; command-line interface; Web browser; out-of-band management (serial RS-232C)	HP ProCurve Manager Plus; HP ProCurve Manager; command-line interface; Web browser; out-of-band management (serial RS-232C)
Notes	When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.	When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.
Services	3-year, 4-hour onsite, 13x5 coverage for hardware (U2855E) 3-year, 4-hour onsite, 24x7 coverage for hardware (U2856E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (U6304E) 3-year, 24x7 SW phone support, software updates (UE262E) Installation with minimum configuration, system-based pricing (U4826E) Installation with HP-provided configuration, system-based pricing (U4830E) Refer to the HP Web site at www.procurve.com/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	3-year, 4-hour onsite, 13x5 coverage for hardware (H4496E) 3-year, 4-hour onsite, 24x7 coverage for hardware (H2893E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (U6319E) 3-year, 24x7 SW phone support, software updates (UE264E) Installation with minimum configuration, system-based pricing (U4826E) Installation with HP-provided configuration, system-based pricing (U4830E) Refer to the HP Web site at www.procurve.com/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Standards and protocols
(applies to all products in series)

Device management
RFC 1591 DNS (client)
HTML and telnet management

General protocols
IEEE 802.1D MAC Bridges
IEEE 802.1p Priority
IEEE 802.1Q VLANs
IEEE 802.1s Multiple Spanning Trees
IEEE 802.1v VLAN classification by Protocol and Port
IEEE 802.1w Rapid Reconfiguration of Spanning Tree
IEEE 802.3ad Link Aggregation Control Protocol (LACP)
IEEE 802.3x Flow Control
RFC 768 UDP
RFC 783 TFTP Protocol (revision 2)
RFC 792 ICMP
RFC 793 TCP
RFC 826 ARP
RFC 854 TELNET
RFC 868 Time Protocol
RFC 951 BOOTP
RFC 1058 RIPv1
RFC 1350 TFTP Protocol (revision 2)
RFC 2030 Simple Network Time Protocol (SNTP) v4
RFC 2131 DHCP
RFC 2453 RIPv2
RFC 3046 DHCP Relay Agent Information Option

IP multicast
RFC 3376 IGMPv3 (host joins only)

IPv6
RFC 1981 IPv6 Path MTU Discovery
RFC 2460 IPv6 Specification
RFC 2710 Multicast Listener Discovery (MLD) for IPv6
RFC 2925 Remote Operations MIB (Ping only)
RFC 3019 MLDv1 MIB
RFC 3315 DHCPv6 (client only)
RFC 3513 IPv6 Addressing Architecture
RFC 3596 DNS Extension for IPv6
RFC 3810 MLDv2 (host joins only)
RFC 4022 MIB for TCP
RFC 4113 MIB for UDP
RFC 4251 SSHv6 Architecture
RFC 4252 SSHv6 Authentication
RFC 4253 SSHv6 Transport Layer
RFC 4254 SSHv6 Connection
RFC 4293 MIB for IP
RFC 4419 Key Exchange for SSH
RFC 4443 ICMPv6
RFC 4541 IGMP & MLD Snooping Switch
RFC 4861 IPv6 Neighbor Discovery
RFC 4862 IPv6 Stateless Address Auto-configuration

MIBs
RFC 1213 MIB II
RFC 1493 Bridge MIB
RFC 1724 RIPv2 MIB
RFC 2021 RMONv2 MIB
RFC 2613 SMON MIB
RFC 2618 RADIUS Client MIB
RFC 2620 RADIUS Accounting MIB
RFC 2665 Ethernet-Like-MIB
RFC 2668 802.3 MAU MIB
RFC 2674 802.1p and IEEE 802.1Q Bridge MIB
RFC 2737 Entity MIB (Version 2)
RFC 2863 The Interfaces Group MIB

Network management
IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events)
RFC 3176 sFlow
ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED)
SNMPv1/v2c/v3
XRMON

QoS/Cos
RFC 2474 DiffServ Precedence, including 8 queues/port
RFC 2597 DiffServ Assured Forwarding (AF)
RFC 2598 DiffServ Expedited Forwarding (EF)
Ingress Rate Limiting

Security
IEEE 802.1X Port Based Network Access Control
RFC 1492 TACACS+
RFC 2138 RADIUS Authentication
RFC 2866 RADIUS Accounting
Secure Sockets Layer (SSL)

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Specifications

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Ports	20 RJ-45 auto-sensing 10/100/1000 ports (IEEE 802.3 Type 10Base-T, IEEE 802.3u Type 100Base-TX, IEEE 802.3ab Type 1000Base-T); Media Type: Auto-MDIX; Duplex: 10Base-T/100Base-TX: half or full; 1000Base-T: full only 4 dual-personality ports; each port can be used as either an RJ-45 10/100/1000 port (IEEE 802.3 Type 10Base-T; IEEE 802.3u Type 100Base-TX; IEEE 802.3ab 1000Base-T Gigabit Ethernet) or as a mini-GBIC slot (for use with mini-GBIC transceivers 1 RJ-45 serial console port Supports a maximum of 4 10-GbE ports, with optional module	44 auto-sensing 10/100/1000 ports (IEEE 802.3 Type 10Base-T, IEEE 802.3u Type 100Base-TX, IEEE 802.3ab Type 1000Base-T); Media Type: Auto-MDIX; Duplex: 10Base-T/100Base-TX: half or full; 1000Base-T: full only 4 dual-personality ports; each port can be used as either an RJ-45 10/100/1000 port (IEEE 802.3 Type 10Base-T; IEEE 802.3u Type 100Base-TX; IEEE 802.3ab 1000Base-T Gigabit Ethernet) or as a mini-GBIC slot (for use with mini-GBIC transceivers) 1 RJ-45 serial console port Supports a maximum of 4 10-GbE ports, with optional module
Physical characteristics		
Dimensions	14.4(d) x 17.4(w) x 1.73(h) in. (36.58 x 44.2 x 4.39 cm) (1U height)	14.4(d) x 17.42(w) x 1.73(h) in. (36.58 x 44.25 x 4.39 cm) (1U height)
Weight	12.34 lb. (5.6 kg)	12.96 lb. (5.88 kg)
Memory and processor		
Processor	Dual ARM1156T2S @ 515 MHz, 4 MB flash ROM, 1 GB flash, 512 MB SDRAM; packet buffer size: 6 MB	Dual ARM1156T2S @ 515 MHz, 4 MB flash ROM, 1 GB flash, 512 MB SDRAM; packet buffer size: 6 MB
Mounting	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only
Performance		
1000 Mb Latency	< 2.9 µs (FIFO)	< 2.9 µs (FIFO)
10 Gbps Latency	< 1.3 µs (FIFO)	< 1.3 µs (FIFO)
Throughput	up to 95 million pps	up to 131 million pps
Switching capacity	128 Gbps	176 Gbps
Routing table size	2,000 entries	2,000 entries
MAC address table size	16,000 entries	16,000 entries
Environment		
Operating temperature	32°F to 131°F (0°C to 55°C)	32°F to 131°F (0°C to 55°C)
Operating relative humidity	15% to 95% @ 104°F (40°C), non-condensing	15% to 95% @ 104°F (40°C), non-condensing
Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Non-operating/Storage relative humidity	15% to 95% @ 149°F (65°C), non-condensing	15% to 95% @ 149°F (65°C), non-condensing
Altitude	up to 10,000 ft. (3 km)	up to 10,000 ft. (3 km)
Acoustic	Power: 51.5 dB, Pressure: 38.1 dB; DIN 45635T.19 per ISO 7779	Power: 51.5 dB, Pressure: 38.1 dB; DIN 45635T.19 per ISO 7779
Electrical characteristics		
Description	The switch automatically adjusts to any voltage between 100-127 and 200-240 volts and either 50 or 60 Hz	The switch automatically adjusts to any voltage between 100-127 and 200-240 volts and either 50 or 60 Hz
Maximum heat dissipation	447 BTU/hr (472 kJ/hr), max. using PoE+	667 BTU/hr (704 kJ/hr), max. using PoE+
Voltage	100-127 / 200-240 VAC	100-127 / 200-240 VAC
Current	6.1 / 3.1 A	6.4 / 3.2 A
Idle power	65 W	89 W
Power consumption	490 W	556 W
Frequency	50 / 60 Hz	50 / 60 Hz
Notes	Idle power is the power consumption of the base system with no traffic. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the power consumption of the base system with no traffic. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.
Safety	EN 60950/IEC 60950; CAN/CSA 22.2 No. 60950; EN 60825; UL 60950	EN 60950/IEC 60950; CAN/CSA 22.2 No. 60950; EN 60825; UL 60950
Emissions	FCC part 15 Class A; EN 55022/CISPR-22 Class A; VCCI Class A	FCC part 15 Class A; EN 55022/CISPR-22 Class A; VCCI Class A
Immunity		
EN	EN 55024, CISPR 24	EN 55024, CISPR 24
ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD	IEC 61000-4-2; 4 kV CD, 8 kV AD
Radiated	IEC 61000-4-3; 3 V/m	IEC 61000-4-3; 3 V/m
EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
Surge	IEC 61000-4-5; 1 kV / 2 kV AC, 1 kV signal, 0.5 kV DC	IEC 61000-4-5; 1 kV / 2 kV AC, 1 kV signal, 0.5 kV DC
Conducted	IEC 61000-4-6; 3 V	IEC 61000-4-6; 3 V
Power frequency magnetic field	IEC 61000-4-8; 1 A/m	IEC 61000-4-8; 1 A/m
Voltage dips and interruptions	IEC 61000-4-11; > 95% reductions, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; > 95% reductions, 0.5 period; 30% reduction, 25 periods
Harmonics	IEC 61000-3-2	IEC 61000-3-2

Specifications (continued)

	HP ProCurve 2910al-24G-PoE+ Switch (J9146A)	HP ProCurve 2910al-48G-PoE+ Switch (J9148A)
Flicker	IEC 61000-3-3	IEC 61000-3-3
Management	HP ProCurve Manager Plus; HP ProCurve Manager; command-line interface; Web browser; out-of-band management (serial RS-232C)	HP ProCurve Manager Plus; HP ProCurve Manager; command-line interface; Web browser; out-of-band management (serial RS-232C)
Notes	When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.	When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.
Services	3-year, 4-hour onsite, 13x5 coverage for hardware (U2855E) 3-year, 4-hour onsite, 24x7 coverage for hardware (U2856E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (U6304E) 3-year, 24x7 SW phone support, software updates (UE262E) Installation with minimum configuration, system-based pricing (U4826E) Installation with HP-provided configuration, system-based pricing (U4830E) Refer to the HP Web site at www.procurve.com/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	3-year, 4-hour onsite, 13x5 coverage for hardware (H4496E) 3-year, 4-hour onsite, 24x7 coverage for hardware (H2893E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (U6319E) 3-year, 24x7 SW phone support, software updates (UE264E) Installation with minimum configuration, system-based pricing (U4826E) Installation with HP-provided configuration, system-based pricing (U4830E) Refer to the HP Web site at www.procurve.com/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Standards and protocols
(applies to all products in series)

Device management
RFC 1591 DNS (client)
HTML and telnet management

General protocols
IEEE 802.1D MAC Bridges
IEEE 802.1p Priority
IEEE 802.1Q VLANs
IEEE 802.1s Multiple Spanning Trees
IEEE 802.1v VLAN classification by Protocol and Port
IEEE 802.1w Rapid Reconfiguration of Spanning Tree
IEEE 802.3ad Link Aggregation Control Protocol (LACP)
IEEE 802.3x Flow Control
RFC 768 UDP
RFC 783 TFTP Protocol (revision 2)
RFC 792 ICMP
RFC 793 TCP
RFC 826 ARP
RFC 854 TELNET
RFC 868 Time Protocol
RFC 951 BOOTP
RFC 1058 RIPv1
RFC 1350 TFTP Protocol (revision 2)
RFC 2030 Simple Network Time Protocol (SNTP) v4
RFC 2131 DHCP
RFC 2453 RIPv2
RFC 3046 DHCP Relay Agent Information Option

IP multicast
RFC 3376 IGMPv3 (host joins only)

IPv6
RFC 1981 IPv6 Path MTU Discovery
RFC 2460 IPv6 Specification
RFC 2710 Multicast Listener Discovery (MLD) for IPv6
RFC 2925 Remote Operations MIB (Ping only)
RFC 3019 MLDv1 MIB
RFC 3315 DHCPv6 (client only)
RFC 3513 IPv6 Addressing Architecture
RFC 3596 DNS Extension for IPv6
RFC 3810 MLDv2 (host joins only)
RFC 4022 MIB for TCP
RFC 4113 MIB for UDP
RFC 4251 SSHv6 Architecture
RFC 4252 SSHv6 Authentication
RFC 4253 SSHv6 Transport Layer
RFC 4254 SSHv6 Connection
RFC 4293 MIB for IP
RFC 4419 Key Exchange for SSH
RFC 4443 ICMPv6
RFC 4541 IGMP & MLD Snooping Switch
RFC 4861 IPv6 Neighbor Discovery
RFC 4862 IPv6 Stateless Address Auto-configuration

MIBs
RFC 1213 MIB II
RFC 1493 Bridge MIB
RFC 1724 RIPv2 MIB
RFC 2021 RMONv2 MIB
RFC 2613 SMON MIB
RFC 2618 RADIUS Client MIB
RFC 2620 RADIUS Accounting MIB
RFC 2665 Ethernet-Like-MIB
RFC 2668 802.3 MAU MIB
RFC 2674 802.1p and IEEE 802.1Q Bridge MIB
RFC 2737 Entity MIB (Version 2)
RFC 2863 The Interfaces Group MIB

Network management
IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events)
RFC 3176 sFlow
ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED)
SNMPv1/v2c/v3
XRMON

QoS/Cos
RFC 2474 DiffServ Precedence, including 8 queues/port
RFC 2597 DiffServ Assured Forwarding (AF)
RFC 2598 DiffServ Expedited Forwarding (EF)
Ingress Rate Limiting

Security
IEEE 802.1X Port Based Network Access Control
RFC 1492 TACACS+
RFC 2138 RADIUS Authentication
RFC 2866 RADIUS Accounting
Secure Sockets Layer (SSL)

HP ProCurve 2910al Switch Series accessories

HP ProCurve 620 Redundant/External Power Supply (J8696A)
HP ProCurve 100-FX SFP-LC Transceiver (J9054B)
NEW HP ProCurve 10-GbE SFP+ SR Transceiver (J9150A)
NEW HP ProCurve 10-GbE SFP+ LR Transceiver (J9151A)
NEW HP ProCurve 10-GbE SFP+ LRM Transceiver (J9152A)
NEW HP ProCurve 10-GbE SFP+ 1m Direct Attach Cable (J9281A)
NEW HP ProCurve 10-GbE SFP+ 3m Direct Attach Cable (J9283A)
NEW HP ProCurve 10-GbE SFP+ 7m Direct Attach Cable (J9285A)
NEW HP ProCurve 1000-BX-D SFP-LC Mini-GBIC (J9142B)
NEW HP ProCurve 1000-BX-U SFP-LC Mini-GBIC (J9143B)
HP ProCurve Manager 2.3 (-)
HP ProCurve Identity Driven Manager 2.3 base product--500-user license (J9012A)
HP ProCurve Identity Driven Manager 2.3 base product (upgrade from 1.0) (J9013A)
HP ProCurve Identity Driven Manager 2.3--add 2,000 users license (J9014A)
HP ProCurve Manager Plus 2.3 50-device license (J9057A)
HP ProCurve Manager Plus 2.3 upgrade +100-device license (J9058A)
HP ProCurve Manager Plus 2.3 unlimited-device license (J9059A)
HP ProCurve Network Immunity Manager 1.0 50-device license (J9060A)
HP ProCurve Network Immunity Manager 1.0 +100-device license (J9061A)
HP ProCurve Gigabit-SX-LC Mini-GBIC (J4858C)
HP ProCurve Gigabit-LX-LC Mini-GBIC (J4859C)
HP ProCurve Gigabit-LH-LC Mini-GBIC (J4860C)
NEW HP ProCurve 100-BX-D SFP-LC Transceiver (J9099B)
NEW HP ProCurve 100-BX-U SFP-LC Transceiver (J9100B)

al Modules

NEW HP ProCurve 10-GbE 2-Port CX4 al Module (J9149A)
NEW HP ProCurve 10-GbE 2-Port SFP+ al Module (J9008A)
NEW HP ProCurve 10-GbE al Interconnect Kit (J9165A)

Products within this series have achieved sufficient scores in each of the rated criteria to achieve the Miercom Certified Green distinction Award. See the Specifications section of this series for more information.

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